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COMMONWEALTH OF AUSTRALIA

# PATENT SPECIFICATION

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Classes 91.8; 59.9; 91.2

Drawings (3 sheets) attached.

## COMPLETE SPECIFICATION

**"Improved means for loading, stowing and unloading cargoes of ships."**

I, ALEXANDER SLATER, of 13 Fraser Street, West St. Kilda, in the State of Victoria, Commonwealth of Australia, Seaman, hereby declare this invention and the manner in which it is to be performed, to be fully described and ascertained in and by the following statement:—

This invention relates to means for the handling of ships cargoes, and is directed to the loading and stowing of cargo in the holds of a ship and the unloading of cargo from the holds and transference thereof to a wharf, alongside which the ship is berthed.

It is of special importance that the loading, stowing and unloading of ships cargoes should be easily carried out with a minimum expenditure of time and labour, in order to reduce as much as possible the time during which the ships remain in port. Delays at the wharfside involve the payment of heavy harbour dues, and moreover, ships in being

unduly retained may preclude other ships from occupying the berthing space, so that the latter ships must remain longer in port than would be necessary if the cargo of the former ships were more expeditiously handled. Furthermore, particularly at the present time in view of the shortage of essential goods in many countries, it is very important that ships upon being berthed, should be cleared expeditiously, so as to leave for the next port of call with the least delay.

In recent times the hold carrying capacity of ships has been considerably increased, which is further apt to prolong the time during which a ship is compelled to remain berthed.

With the above considerations in view, it will be understood that the means for removing and transferring cargo from a ship's holds to a wharf, and lifting cargo from the wharf and stowing it in the holds should be efficient and speedy in operation.

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Port authorities have endeavoured to meet these conditions, by the provision of mobile cranes on the wharf, but such cranes have not materially solved the difficulties involved in the rapid handling of cargo, which still requires much manual handling, an obviously expensive laborious and time consuming operation.

The applicant having had many years maritime service and long experience in the loading and unloading of cargoes of all descriptions, has devised the present invention, with the principal objective of speeding up the handling of cargo both in the clearance thereof from ships holds to wharf and in the lifting of cargo from the latter and stowing thereof in the former.

In the Applicant's Patent No. 126924, there is described a ship's gear or system of derricks whereby a substantially mechanised system for handling cargo is provided and time and labour involved substantially reduced, but the system of derricks and gear of this prior application was concerned more particularly with the loading and unloading of ship's holds through hatchways on the upper deck.

In achieving the above stated principal objective and according to the invention, means are provided whereby cargo may be expeditiously loaded and unloaded through the sealable doorways or openings in the sides of a ship's hull, said means comprising a platform supporting at each door opening and movable in board and outboard through the door opening so as to extend outwardly from the side of the hull for use in receiving cargo from the wharf and in the unloading of cargo from hold to wharf.

The platform so movable through the door opening, enables cargo to be readily transferred inwardly or outwardly through the door opening as required, and each platform when extended outwardly from the hull may be serviced by motor driven transporter trollies on the wharf for removal of cargo therefrom in unloading a ship or placing cargo thereon when loading. Moreover, the movable platform when extended outboard may be serviced by motor driven transportation trollies within the ship, so that cargo may be readily transferred to or from the movable platform by the trollies from or to

any point of a ship's hold. The motor driven trollies are of the type having elevators or fork lifts whereby pallets or frames having cargo stacked thereon may be readily raised and lowered, thus enabling cargo to be stowed in and removed from a ship's hold with facility, and further permitting cargo to be placed upon or removed from the platforms when extended outwardly from a ship irrespective of the height of the platforms above a wharf, i.e. within the limits of vertical travel of the elevators or fork lifts.

An object of the invention is the provision of improvements in wharf construction specially adapted for co-operation of transporter fork lift trollies with the movable platforms above briefly described, and whereby the usual timber beam or kerbing along the edges of a wharf are dispensed with.

In accomplishing this object, and according to the invention there is provided adjacent the edge of a wharf, a multiple number of separate detachable units or stands arranged in alignment to comprise a fence or barrier along the edge of a wharf, and extendable wharf plates which upon removal of a detachable unit or units may be extended from the wharf to a ship's side to carry an elevator trolley whereby cargo may be raised to or lowered from a movable platform upon the latter being extended from the ship's side.

For a better understanding of the invention reference will now be made to the accompanying drawings, wherein:

Fig. 1 is a side elevation of a ship having side openings equipped with movable platforms for inward and outward transference of cargo, and shown alongside a wharf.

Fig. 2 is a side elevation on a larger scale of one of the side openings and movable platforms shown by Fig. 1.

Fig. 3 is a sectional view taken on the line 3-3 of Fig. 2.

Fig. 4 is a vertical section on the line 4-4 of Fig. 3.

Fig. 5 is a perspective view of a corner of one of the movable platforms and of a part of the platform suspension means.

Fig. 6 is a sectional plan of the lower deck of the ship shown in Fig. 1.

Fig. 7 is a sectional view of a cavity in a wharf surface having a fastening ring secured therein.

Fig. 8 is a sectional view of a portion of a hold of the ship shown by Fig. 1, illustrating the handling of cargo in the tween deck space by a fork lift transporter.

Fig. 9 is a vertical section of a portion of a hold, showing a hatch-way and a removable cover together with lifting and transporting means for the latter.

Fig. 10 is a sectional view on the line 10-10 of Fig. 9.

Fig. 11 is a fragmentary plan view of the hatch-way and removable cover shown in Fig. 9.

Fig. 12 is an inverted plan of the removable cover shown separately.

Fig. 13 is a sectional elevation of the hatch-way of Fig. 9 and a removable safety fence surrounding the hatchway.

Fig. 14 is a fragmentary plan view of the hatchway and safety fence shown in Fig. 13.

Fig. 15 is a vertical sectional elevation of a portion of a wharf and of an elevatable and pivoted fence mounted thereon.

Fig. 16 is a plan of the wharf portion and fence shown by Fig. 15.

Referring to the drawings in more detail and firstly to Figs. 1 to 6, the numeral 1 designates generally a ship moored alongside a wharf indicated by 2.

Formed at required spaced intervals in the ship's side or hull 3 are entrances or doorways 4 which are closed by sealable doors 5, supported by hinges 6 secured to the hull 3 adjacently to the doorways 4.

Each doorway 4 is provided with a movable platform 7 which at the inner side of the former is pivotally connected to brackets 8, secured as by welding to and projecting from the hull 3 into the tween deck space somewhat below the lower edge of the doorway.

Each doorway is located at a required height above the tween deck floor, for instance with a tween deck space  $14\frac{1}{2}$  feet in

height and a doorway  $7\frac{1}{2}$  feet high, the distance from the lower edge of the doorway to the tween deck floor may be  $6\frac{1}{2}$  feet.

The brackets 8 extend upwardly and the upper ends 9 thereof are substantially level with the lower edge of the doorway 4. These brackets are protected by a bumper plate 10 for a purpose described presently.

By means of the pivotal connections with the brackets 8, the movable platform 7, the top or table of which may comprise a steel plate 11, may be swung outboard through the doorway so as to project outwardly from the ship's hull 3 for use as a support for cargo in being loaded or unloaded, see Fig. 3.

In the outboard position, the movable platform 7, while remaining connected with the brackets 8, is seated upon the lower edge 12 of the doorway and is further supported by chain bridles 13 connected to plates or dead eyes 14 secured to the ship's hull above the level of the upper edge 15 of the doorway. At the lower ends the bridles 13 are connected to bent links 13a which engage the platform and are secured to eyes 13b in the underside of the former, see Fig. 5.

When thus positioned and supported, the movable platform 7 is in readiness to receive cargo being unloaded from a ship's hold or cargo being loaded into the ship from the adjacent wharf 2.

For the purpose of transferring cargo within the ship's hold, i.e. to or from the movable platform when the latter is positioned for use as described, a motor driven trolley or transporter 16 having an elevator or fork lift 17 is utilised and is driven upon the floor 18 of the tween deck space to various parts of the ship's hold to carry cargo thereto or therefrom, the fork lift 17 being used for stacking cargo or removing stacked cargo, as required, see particularly Fig. 8.

The bumper plate 10 previously referred to, protects the brackets 8 from impact and damage by the motor driven trolley 16, and for this purpose an additional bumper plate 19 may be secured to the tween deck floor 18.

The doorways or openings 4 may be reinforced by a strengthening frame 20 at each

side, and the opposite frames may be slotted as at 21, to receive the ends of staging planks or boards (not shown) for use by an operative in operating the clamping beams 22 whereby the side doors 5 are secured and clamped against leakage.

In order to transfer cargo between the wharf 2 and the movable platform 7 and between latter and the former, an elevator or fork lift motor trolley indicated by 23 is employed.

To permit the trolley 23 to be driven closely to the side of the berthed ship 1, movable supporting or wharf plates 24 are provided. These wharf plates 24 are extendable from the edge of the wharf 2 and in extended position are supported at the outer ends by lifting means or tackle 25 attached to the wharf plates and anchored at the upper end to dead eyes 26 or the like, secured to the ship's hull 3.

For convenience in handling, cargo indicated by 27, may be stacked on pallets 28, and accordingly, a pallet 28 with cargo thereon may be picked up by the elevator trolley 23 at any point of the wharf 2, driven to and upon a wharf plate 24 to a ship's side, and operated to elevate and transfer the pallet 28 and cargo to the movable platform 7, whereupon, the pallet 28 and cargo 27 are removed from the platform by the elevator trolley 16 and transported and stacked at any required part of the ship's hold as previously described herein.

Conversely, a pallet 28 with cargo 27 thereon may be picked up by the elevator trolley 16 within the hold and conveyed to the outwardly extended movable platform 7, and taken and lowered from the latter by the trolley 23 and transported there to any part of the wharf 2.

Accordingly, it will be apparent that by means of the movable platform 7, the extendable wharf plate 24 and the elevator trolleys 16 and 23, the handling of cargo both into and out of the ship's hold is greatly facilitated with a minimum expenditure of time and labour.

The pallets 28 comprise rectangular frames open at the ends to receive the blades or prongs 29 of the fork lifts 17.

The cargo 27 is placed upon the pallets 28 and it will be apparent that the blade 29 of the fork lift may be readily thrust within a pallet by driving the trolley transporter, and that the pallet and cargo thereon may be raised for stowing and lowered for removal of stacked cargo, as shown by Fig. 8.

It will be understood that the fork lift transporter 16 within the ship, is driven about the several decks for stowing and unloading cargo and is raised and lowered from deck to deck through the hatchways.

To permit the transporter 16 to be so driven, openings 31 (see Fig. 6), are made in the partitions and bulkheads, the openings in the latter being provided with watertight doors (not shown) of usual construction, and sunk covers or plates 32 are provided for the hatchways, the upper surface of the covers being flush or level with the surrounding deck surface, see Figs. 10 and 11.

Each hatchway is fitted with a frame 33 having formed therein Tee-shaped slots 34 (see Fig. 11), which receive the ends 35 of Tee-section bars 36 welded to the underside of each cover 32 upon the latter being placed within the hatchway and seated upon the frame 33. The Tee-shaped ends 35 when engaged with the complementary Tee-slots 34 firmly secure the cover 32 in place with the upper surface of the latter flush or level with the surrounding deck so that the fork lift transporter may be driven without obstruction about the deck.

Furthermore, to permit of unimpeded travel and steering of the fork lift transporter, the overlapping edges of the deck plates (not shown) are appropriately angled or bevelled.

To secure the fork lift transporters against movement when the ship is at sea, there are provided ring bolts or the like (not shown), which are secured to the hull or bulkheads in the tween deck spaces and to which the transporters are firmly attached by ropes or lashings.

For the purpose of removing and replacing the hatch covers 32, there is provided lifting tackle 37 engageable by hooks 38 with eyes 39 recessed into each cover, see Fig. 9.

The lifting tackle 37 is suspended from a carriage 40 movably supported by rollers 41 upon fixed conveyor rails 42, and accordingly the cover 32 upon being lifted clear of the hatchway may be moved aside to a convenient position, indicated by chain dotted lines in Fig. 10.

To guard against accidents, a removable fence 43 is positioned around each hatchway upon removal of the cover 32 therefrom, see Figs. 13 and 14.

This fence comprises posts or uprights 44 having chains 45 attached thereto and extending therebetween, the posts 44 being made of square section at the lower ends to detachably fit complementary apertures 46 formed in the deck 18 about and appropriately spaced from the marginal edges 47 of the hatchway as shown by Fig. 11.

To permit the wharf plates 24 to be readily extended to a ship's side, the usual kerbing or beam extending along the edge of a wharf is dispensed with and the construction of the wharf is modified.

In this modified wharf construction, there is a wall or coping 48 of concrete extending along the edge of the wharf and having the upper surface thereof flush or level with the surface of the wharf decking.

Set at spaced intervals in recesses 49 in the concrete wall or coping 48 and near the edge thereof are eye bolts 50 and rings 51 which are sunk somewhat below the level of the wharf surface and are used for attachment of ships side nets and lanyards (see Fig. 7).

Extending vertically through the concrete coping 48 and located somewhat inwardly from the eye bolts 50 and rings 51, is a series of spaced sleeves or pipes 52 which extend in row formation along the wharf and near the edge thereof (see Fig. 15). Into these spaced sleeves 52 are slidably insertible the legs 53, also comprised of tubing, of removable stands or barriers 54 which comprise a fence indicated in general by 55, along the wharf edge.

The stands or barriers 54 are constructed in sections, which are separate, so that any section may be removed as required to per-

mit a wharf plate to be extended from the wharfside to a ship as above described.

In order that the sections may be easily removed, each section has a tubular leg 53a at one end of greater length than the remaining legs, which latter are of substantially equal length. Accordingly, the legs 53a of

greater length may remain in engagement with the tubular sleeve 52, while the remaining legs are raised clear of the surface of the concrete coping 48, thereby permitting the section to be opened similarly to a gate and placed in contact with an adjoining section to provide space for an extendable wharf plate, as shown by chain dotted lines in Figs. 15 and 16.

Having now fully described and ascertained my said invention and the manner in which it is to be performed, I declare that what I claim is:—

1. Means co-operative with mobile cargo elevating units for loading, stowing and unloading a ship's cargo, comprising a support movably mounted at each of the sealable doorways or openings in the sides of the ship's hull and movable inboard and outboard through the door opening so as to extend outwardly from the side of the hull for use with a mobile elevating unit on the wharf and with a mobile elevating unit within the ship for loading and unloading cargo as herein specified.

2. Means co-operative with mobile cargo elevating units of fork lift trolley type for loading, stowing and unloading a ship's cargo, comprising a platform supported at each of the sealable doorways or openings in the sides of the ship's hull and movable inboard and outboard through the door opening so as to extend outwardly from the side of the hull for use with a fork lift trolley on the wharf and with a fork lift trolley within the ship for the purposes herein specified.

3. Means for loading, stowing and unloading a ship's cargo as claimed in claim 2, wherein the platform is pivotally supported at the inner side of the door opening and angularly movable inwardly and outwardly through the door opening to and from the outwardly extended cargo receiving and unloading position.

4. Means for loading, stowing and unloading a ship's cargo as claimed in claim 2 or claim 3, wherein the platform is pivotally connected to a multiple number of brackets, and guard means are provided for protecting the brackets against impact by the fork lift trollies.

5. Means for loading, stowing and unloading a ship's cargo as claimed in claim 2, 3 or 4, wherein each doorway or opening is reinforced by a frame at each side, and the oppositely positioned frames are slotted to receive staging planks or boards for the purpose herein specified.

6. Means for loading, stowing and unloading a ship's cargo as claimed in claim 2, 3 or 4, wherein the platform in the outwardly extended cargo receiving and unloading position projects from the ship's side or hull and is retained by suspension means in a substantially horizontal position.

7. Means for loading, stowing and unloading a ship's cargo as claimed in any one of claims 1 to 6, including a bridging member or plate for the mobile elevating unit or fork lift trolley, supported at one end upon the wharf and at the opposite end by adjustable suspension means secured to the ship.

8. Means for loading, stowing and unloading a ship's cargo as claimed in any one of the preceding claims, wherein the decks supporting the mobile elevating unit or fork lift trolley within the ship are provided with hatchways having covers flush or level with the deck surfaces, and openings are provided in the bulkheads or athwartship partitions for passage of the mobile elevating unit or fork lift trolley.

9. Means for loading, stowing and unloading a ship's cargo as claimed in claim 8, wherein a marginal frame is fitted in each hatchway and each cover on the underside is provided with interlocking members engageable with complementary slots in the marginal frame.

10. Means for loading, stowing and unloading a ship's cargo as claimed in claim 8 or claim 9, including lifting and traversing apparatus, for removal, transportation and replacement of each hatchway cover.

11. Means for loading, stowing and unloading a ship's cargo as claimed in any one of claims 1 to 4 wherein the marginal edge or kerb of the wharf is flat and co-extensive with the surface or decking of the wharf, and a removable fence is provided along the marginal edge of the wharf.

12. Means for loading, stowing and unloading a ship's cargo as claimed in claim 11, wherein the removable fence comprises a multiple number of separate pivoted and elevatable frame sections disposed in longitudinal alignment, each frame section having end supports seated upon the wharf.

13. Means for loading, stowing and unloading a ship's cargo as claimed in claim 12, wherein a multiple number of spacedly related vertically disposed openings are formed in longitudinal alignment in the wharf near the edge thereof, and members dependent from the frame sections engage tubular sleeves in said openings for the purpose herein specified.

14. Means for loading, stowing and unloading a ship's cargo as claimed in claim 13, wherein one of the dependent members positioned at or near an end of each frame section is of greater length than the remaining members for the purpose herein specified.

15. Means co-operative with mobile elevating units or fork lift trollies for loading, stowing and unloading a ship's cargo, constructed and operating substantially as herein described with reference to and as illustrated by Figs. 1 to 6 and 8 to 14 of the accompanying drawings.

16. Means co-operative with mobile elevating units or fork lift trollies for loading, stowing and unloading a ship's cargo and including a removable wharf kerb fence constructed and operable substantially as described herein with reference to and as illustrated by Figs. 15 and 16 of the accompanying drawings.

17. Means co-operative with mobile elevating units or fork lift trollies for loading, stowing and unloading a ship's cargo constructed and operating substantially as herein described and as illustrated by the accompanying explanatory drawings.

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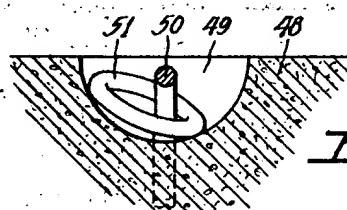


FIG. 7.

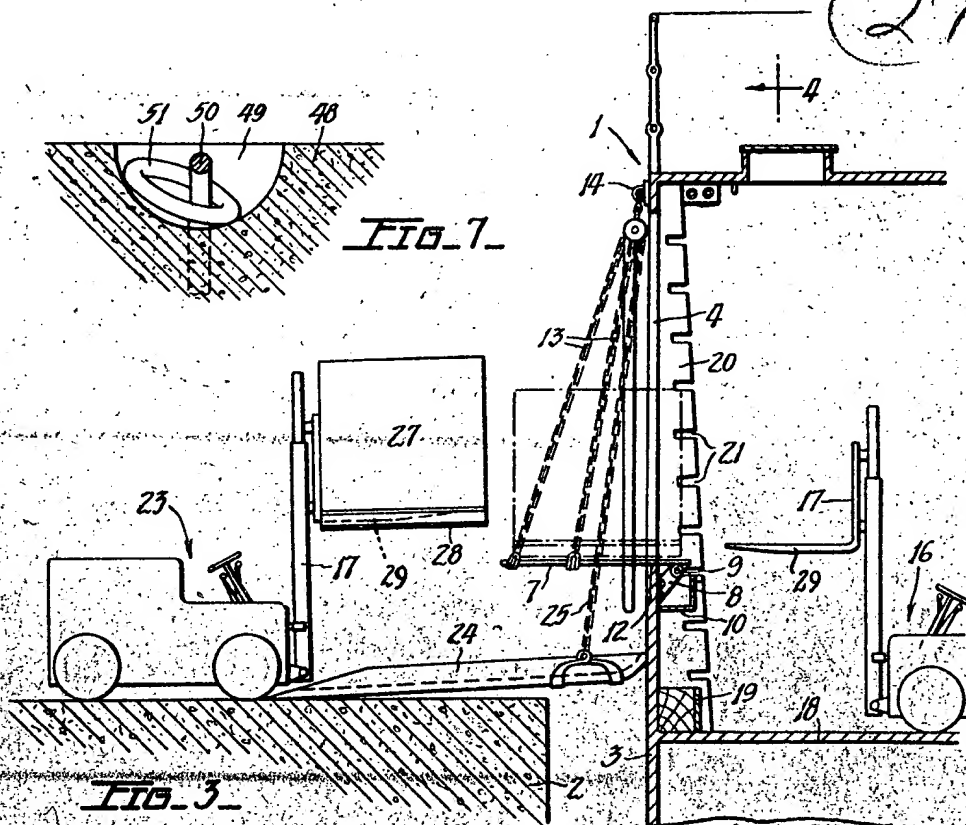


FIG. 3.

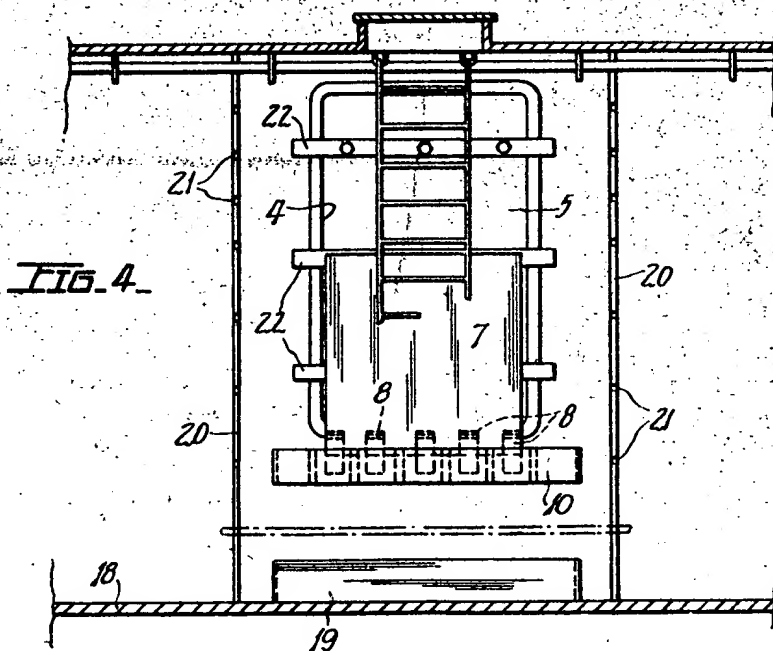
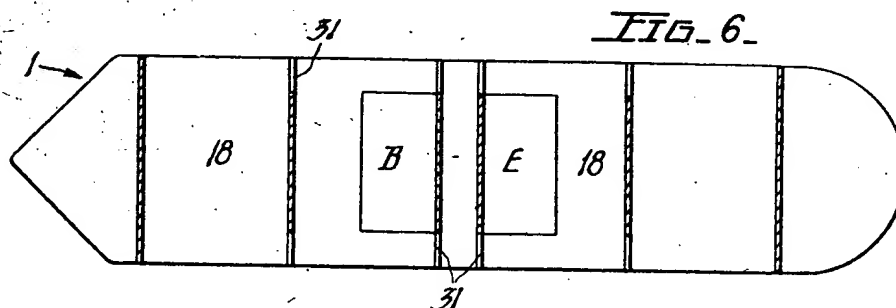
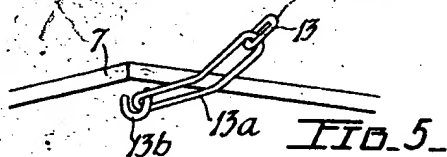
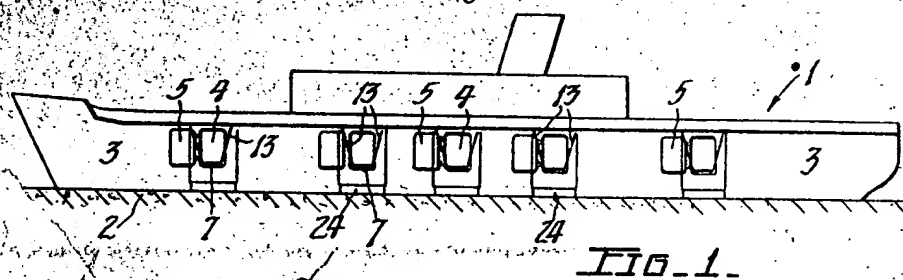
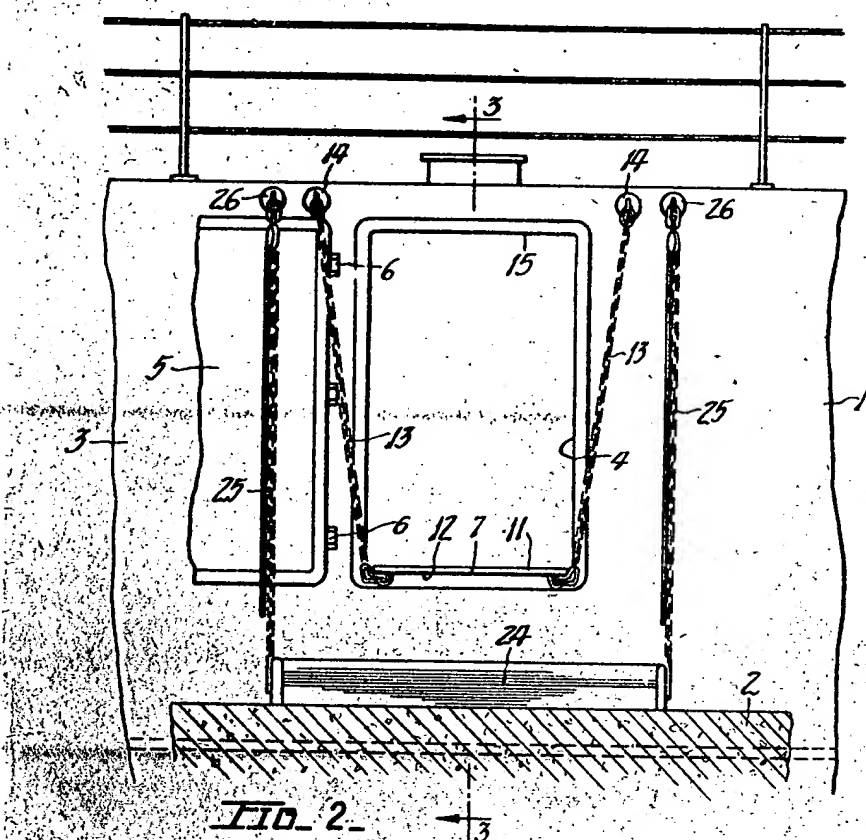


FIG. 4.

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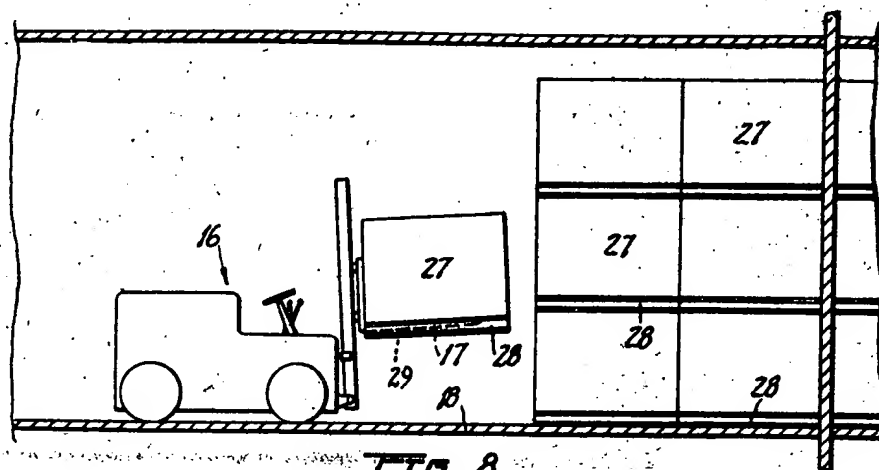


FIG. 8.

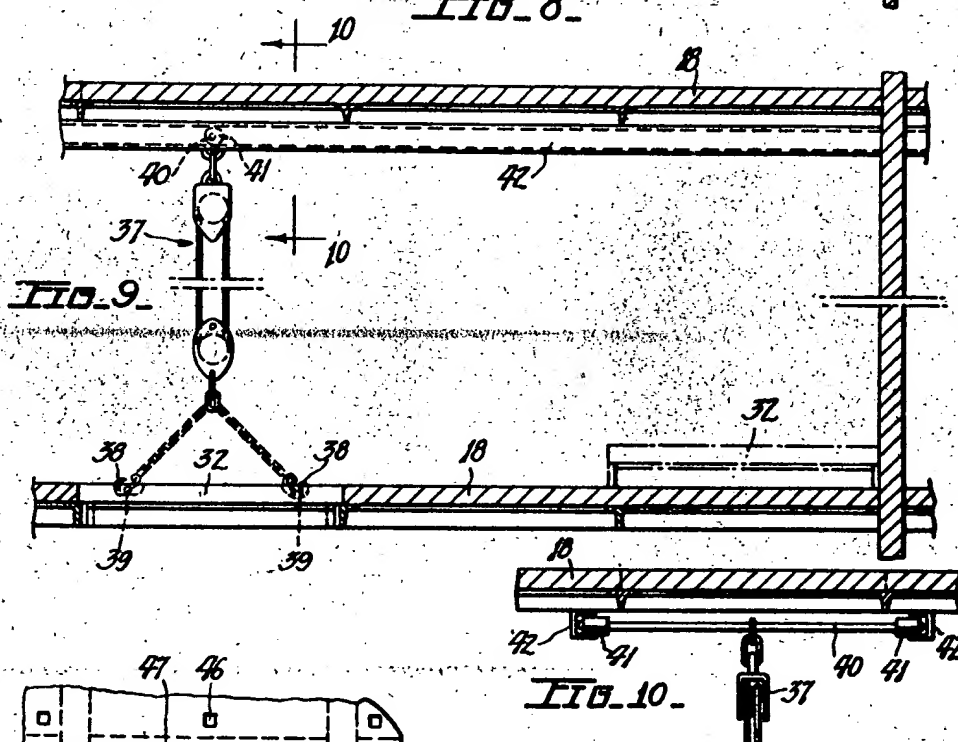


FIG. 9.

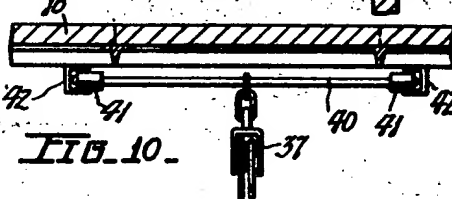


FIG. 10.

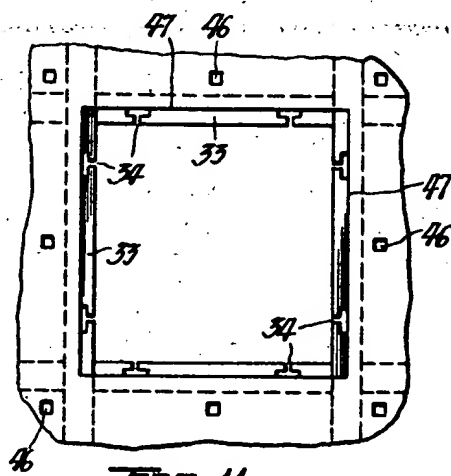


FIG. 11.

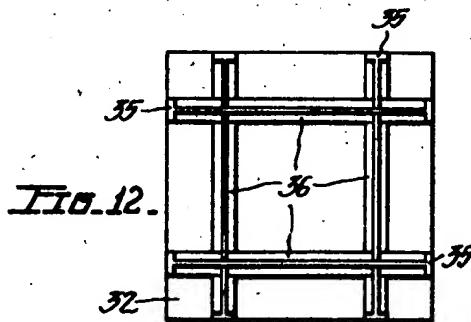


FIG. 12.

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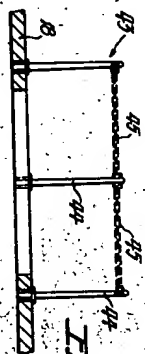


FIG. 13.

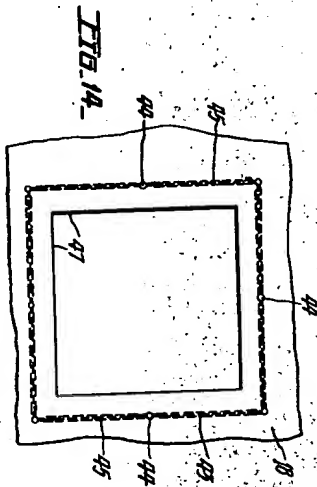


FIG. 14.

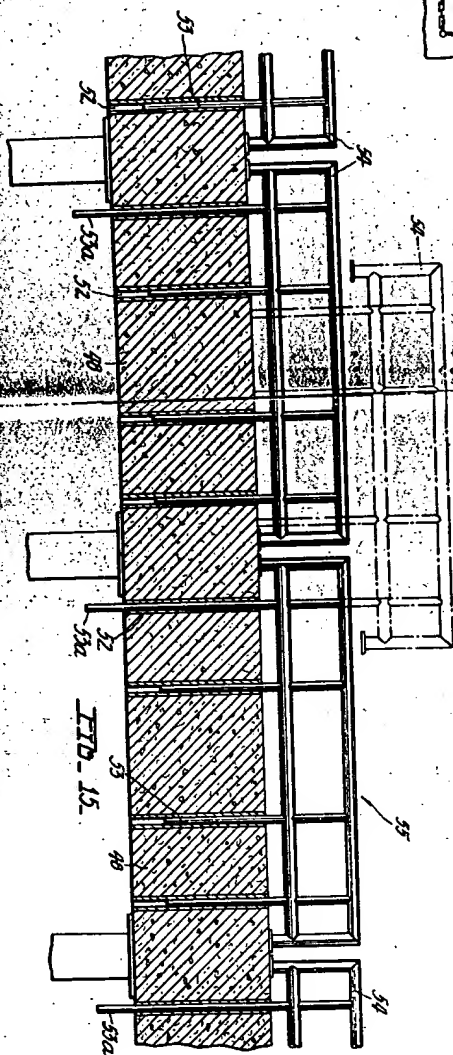


FIG. 15.

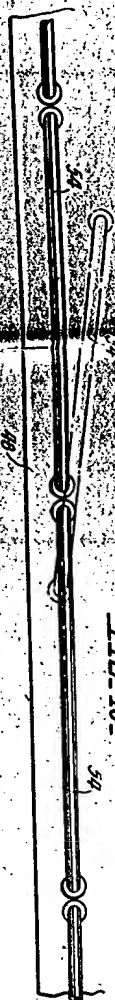


FIG. 16.

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